

Programme Title: MSc Regenerative Medicine



Programme Specification

Awarding Body/Institution	Queen Mary University of London
Teaching Institution	Queen Mary University of London
Name of Final Award and Programme Title	MSc Regenerative Medicine
Name of Interim Award(s)	PGDip and PGCert Regenerative Medicine
Duration of Study / Period of Registration	1 year
QM Programme Code / UCAS Code(s)	A3WA
QAA Benchmark Group	
FHEQ Level of Award	Level 7
Programme Accredited by	N/A
Date Programme Specification Approved	24 May 2017
Responsible School / Institute	Blizard Institute

Schools which will also be involved in teaching part of the programme

School of Engineering & Materials Science

Institution(s) other than Queen Mary that will provide some teaching for the programme

N/A

Programme Outline

Regenerative medicine is an interdisciplinary field, which aims to repair diseased or damaged tissues using biological or cell-based technologies. It is a rapidly growing area of biomedical research that encompasses stem cell biology, tissue engineering, drug delivery, and nanotechnology. This MSc course aims to provide the next generation of scientists and medical professionals with the skills and knowledge required for successful careers in regenerative medicine. The multi-disciplinary programme is based within Barts and The London School of Medicine and Dentistry and delivered jointly with the School of Engineering and Materials Science.

Taught modules will develop a strong scientific foundation in the biology of stem cells and regeneration and the fundamental principles of biomaterials, tissue engineering and cellular reprogramming. The course then will explore how these concepts can be applied in academic and industrial settings, towards the development of novel regenerative technologies and the treatment of disease. Students will also receive practical training in research methods, translation and commercialisation, and ethics.

The MSc course will culminate with an intensive research project where students will work full time investigating a specific topic in Regenerative Medicine. In addition to technical knowledge, the research project will include training in experimental design, effective collaboration, data analysis, and presentation skills.

Students will receive the highest quality instruction from leading scientists and clinicians in their fields and participate in cutting-edge research in regenerative medicine. While enrolled in the MSc programme students will benefit from:

- The expertise of internationally renowned scientists in stem cell biology, cellular regeneration, biomaterials, and tissue engineering.
- Interactive lectures, with tutorials to enhance the individual learning experience.
- Close links to St Bartholomew's and the Royal London Hospitals and interaction with clinicians involved in translational research. These top teaching hospitals treat a large and diverse patient population and are well known for cardio-vascular, cancer, immunology, dermatology and trauma research.
- A strong emphasis on multi-disciplinary training through collaboration with the School of Engineering and Materials Science.
- Access to outstanding research facilities in both the School of Medicine and Dentistry and School of Engineering and Materials Science.
- Attendance at the UK Cancer Stem Cell Symposium, where leading scientists discuss recent developments in stem cell biology related to cancer.
- Industrial contacts, networking opportunities, and support from academic advisors and the student office.

Ultimately, the MSc in Regenerative Medicine will provide students with a sound understanding of the biological basis of tissue regeneration and experience in the application of these principles in research and technology development. Students will be well positioned to continue their research training as PhD students or for professional careers in industry, healthcare, scientific communication or science policy.

Aims of the Programme

- To synthesise and evaluate knowledge in modern concepts of stem cell biology and regenerative medicine, including fundamental principles of developmental biology, biomaterials, tissue engineering and cellular reprogramming.
- To develop the ability to critically appraise scientific literature relevant to regenerative medicine.
- To analyse scientific data in a rigorous manner and interpret the significance of experimental results in the context of previous work in regenerative medicine.
- To display skill in summarising and disseminating results using oral and written communication.
- To develop knowledge and technical ability in biomedical research.

What Will You Be Expected to Achieve?

Upon completion of the MSc in Regenerative Medicine, students will be well placed for further training at the PhD level or professional careers in the biotechnology and pharmaceutical industries. As a multi-disciplinary course, the MSc is appropriate for a wide range of students. Graduates with degrees in biological sciences or medicine will gain an in-depth understanding of the cellular and molecular aspects of regenerative medicine as well as an introduction to the interdisciplinary fields of biomaterials and tissue engineering. Similarly, students with a physical sciences background will have the opportunity to broaden their experiences and acquire new skills in the biological sciences. The research project provides training in research techniques, data analysis, oral presentation skills, and critical appraisal of the scientific literature. This training also will provide essential transferable skills for a future career path.

Academic Content:

A1	Apply fundamental principles in biomaterials and tissue engineering to problems in regenerative medicine
A2	Develop in depth knowledge of the molecular and cellular basis of development, stem cell biology, and tissue regeneration
A3	Describe and select appropriate research methods for investigating pluripotent and adult stem cells

Programme Title: MSc Regenerative Medicine

A 4	Critically analyse and evaluate cell-based therapies in regenerative medicine
A 5	Assess the ethical and regulatory issues associated with stem cell and regenerative research

Disciplinary Skills - able to:	
B 1	Display skill in summarising and disseminating results in oral and written communication
B 2	Design appropriate experiments to test a hypothesis
B 3	Integrate information from a variety of sources to construct a coherent analysis on a scientific topic
B 4	Collect and analyse experimental data from which to draw appropriate conclusions

Attributes:	
C 1	Develop the ability to engage and communicate effectively with diverse audiences using oral and written methods
C 2	Critically evaluate one's own work in a reflective manner and that of others in a respectful and constructive fashion
C 3	Work independently when appropriate and negotiate effective working relationships in a collaborative environment
C 4	Conduct work in a professional manner mindful of the necessity of intellectual integrity and ethical responsibility

How Will You Learn?

- Each topic will be taught using a range of methods, varying according to the subject and learning objectives of the module. Modules may include lectures, small group tutorials, presentations, group discussion, practical classes and independent study. Most modules will follow a format of structured preparatory work (reading and reflection exercises), with a weekly interactive lecture.
- As regenerative medicine is a multi-disciplinary field, collaborative group projects will be a significant component, and students will have the opportunity to work with and learn from their peers.
- The final research project will also be an essential part of the learning process. By working on a significant independent research project, students will gain new technical knowledge relevant to their thesis topic. In addition, students will develop research and transferable skills, such as literature review, data analysis, presentation skills, and scientific writing.
- Visiting speakers will describe current research in different fields relevant to regenerative medicine.
- Attendance at the UK Cancer Stem Cell Symposium, where leading scientists discuss recent developments in stem cell biology related to cancer.
- As self-directed learning is a major component of each module, students will be encouraged to be pro-active in identifying their own learning needs as modules progress. As a guide, the typical number of hours that a student should expect to spend studying is 4 hours per every hour of contact time.
- Each student will be followed throughout the programme by the Programme Director and by a personal tutor, designated on entry to the course. The personal tutors will advise on issues arising from the course, and will act as mentors and advise on post-course employment and further training opportunities.
- Students will have full access to the college/medical school library and student computing facilities.
- Students will be encouraged to attend seminar programmes organised regularly in the Blizard Institute, the School of Medicine and Dentistry, and the School of Engineering and Materials Science.
- Increasingly the course will use the virtual learning environment provided by the College (QM+). This will enable lecture notes

and handout material to be available electronically, with potential for discussion and question boards. Gradually, this may permit whole modules to be delivered on-line, so that some of the course can be undertaken in future as distance-learning.

How Will You Be Assessed?

Assessment strategy

Full attendance is expected throughout the course and is a pre-requisite for successful completion of the programme (legitimate reasons for absence excused).

The full programme comprises taught compulsory modules (to the total value of 120 credits) plus the core research project (equivalent to 60 credits), with each credit contributing equally to the final mark .

Modules will be assessed through a variety of ways including in-course written assignments, oral presentations, group projects, research proposals and a final examination. Specific details are indicated on each individual Module Proposal form. The research project will be assessed via an oral presentation and a 10,000 word dissertation.

The overall result will reflect the College's marking scheme for categorisation of degrees for taught PG programme.

The award of the degree will be made when a >50% average mark has been achieved across all taught modules and a final mark of >50% has been achieved for the core research module . In the event of a candidate achieving an overall average score of <50% for any of the taught modules, the candidate must take a single re-sit of the required assessment element(s) during the late summer re-sit period, or at an opportunity as specified by the programme team. Re-sits will be capped at 50%. Failure can be condoned in modules (other than the project/dissertation) to the value of 30 Queen Mary credits and in such cases the outcome is known as 'fail condoned, academic credit awarded'.

Students who satisfactorily pass a total of at least 60 credits, will be eligible for the PG Cert award. A student who satisfactorily passes 120 credits, will be eligible for the PG Dip award. These credits may be obtained by passing any of the programme which the student is eligible to take, including the Research Project.

How is the Programme Structured?

The MSc in Regenerative Medicine is a one year, full-time programme. Students are required to complete all the taught and research modules to gain a total of 180 credits. Each 15 credit taught module involves approximately 30 hours of contact time plus 120 hours of independent study. Individual study time could be spent preparing for, or following up on formal study sessions; reading; producing written work; completing projects; and revising for examinations. The direction of the individual study will be guided by the formal study sessions, along with the reading lists and assignments

During Term 3 of the course, students will complete 12 weeks of full time work on their research projects.

Taught Component - Required modules (15 credits each):

Term 1

1. Cellular and molecular basis of regeneration
2. Stem cell and developmental biology
3. Tissue engineering and Regenerative Medicine*
4. Research skills and methodology

Term 2

5. Biomaterials in regenerative medicine
6. Tissue-specific stem cells
7. Induced Pluripotent Stem Cells and Genome Engineering
8. Ethics and regulatory affairs

*Students who have taken Tissue Engineering and Regenerative Medicine as an undergraduate (MAT311) may opt to take an alternative module, Surgical Techniques and Safety or Advanced Structure Property Relationships in Materials.

Research project in regenerative medicine - Core module (60 credits):

Term 3

Programme Title: MSc Regenerative Medicine

Students will select research projects from a wide range of topics in regenerative medicine. Examples include research on the cellular and molecular aspects of tissue regeneration, disease pathogenesis, development of stem cell therapies, design of novel nano-biotechnologies, or engineering biomaterials and tissue scaffolds.

Academic Year of Study 1

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Cellular and molecular basis of regeneration	ICM7141	15	7	Compulsory	1	Semester 1
Stem cell and developmental biology	ICM7142	15	7	Compulsory	1	Semester 1
Tissue Engineering and Regenerative Medicine	MTRM064	15	7	Elective	1	Semester 1
Research skills and methodology	ICMM132	15	7	Compulsory	1	Semester 1
Biomaterials in regenerative medicine	ICM7143	15	7	Compulsory	1	Semester 2
Tissue-specific stem cells	ICM7144	15	7	Compulsory	1	Semester 2
Induced pluripotent stem cells and genome engineering	ICM7145	15	7	Compulsory	1	Semester 2
Ethics and regulatory affairs	DEN7020	15	7	Compulsory	1	Semester 2
Research project in regenerative medicine	ICM7146	60	7	Core	1	Semester 3
Surgical techniques and safety	MELM003	15	7	Elective	1	Semester 1
Advanced structure property techniques in materials	MTRM065	15	7	Elective	1	Semester 1

What Are the Entry Requirements?

- The programme is open to graduate scientists, clinicians and other medical professionals. Entry will require an undergraduate degree, or completion of 3 years of MBBS or MbChB, from a recognised academic institution or an appropriate professional qualification or experience.
- Intercalating medical students must pass year 3 or year 4 exams immediately prior to entry.
- Students must demonstrate a clear and unequivocal interest in the field by written personal statement or interview.
- For students internal and external to QMUL the beginning of the first term for the following year must start after all the assessments for the MSc are completed.

- International applicants: qualification at degree level in an appropriate subject from a university or equivalent institution acceptable to QMUL.

If English is not a student's first language or completed a university degree in majority English speaking country, they will be required to meet the following standards in one of these English language examinations:

Examination	Academic Level Required
IELTS	6.5
IBTOEFL	92
PTE Academic	62

How Do We Listen and Act on Your Feedback?

The Staff-Student Liaison Committee provides a formal means of communication and discussion between schools/institutes and its students. The committee consists of student representatives from each year in the school/institute together with appropriate representation from staff within the school/institute. It is designed to respond to the needs of students, as well as act as a forum for discussing programme and module developments. Staff-Student Liaison Committees meet regularly throughout the year.

Each school/institute operates a Learning and Teaching Committee, or equivalent, which advises the School/Institute Director of Taught Programmes on all matters relating to the delivery of taught programmes at school level including monitoring the application of relevant QM policies and reviewing all proposals for module and programme approval and amendment before submission to Taught Programmes Board. Student views are incorporated in the committee's work in a number of ways, such as through student membership, or consideration of student surveys.

All schools/institutes operate an Annual Programme Review of their taught undergraduate and postgraduate provision. APR is a continuous process of reflection and action planning which is owned by those responsible for programme delivery; the main document of reference for this process is the Taught Programmes Action Plan (TPAP) which is the summary of the school/institute's work throughout the year to monitor academic standards and to improve the student experience. Students' views are considered in this process through analysis of the NSS and module evaluations.

Academic Support

- Programme induction for orientation and introducing study skills.
- Research Skills and Methodology Module in Term 1 includes: practical laboratory techniques, seminars focused on writing, development of critical appraisal skills, training in statistical analysis, and workshops teaching oral presentation skills.
- Course handbook with timetable, other course information and contact details.
- Dedicated intranet website with access to lecture material, assignments and other course information.
- Library facilities with electronic access from distant sites.
- Personal Tutor System: each student will be assigned to a personal tutor, who will act as a mentor to provide support and advice during the course, and advice for career development and further training opportunities.
- Students will be allocated a dissertation supervisor relevant to their topic.

Programme-specific Rules and Facts

Not applicable

Specific Support for Disabled Students

Queen Mary has a central Disability and Dyslexia Service (DDS) that offers support for all students with disabilities, specific learning difficulties and mental health issues. The DDS supports all Queen Mary students: full-time, part-time, undergraduate, postgraduate, UK and international at all campuses and all sites.

Students can access advice, guidance and support in the following areas:

- Finding out if you have a specific learning difficulty like dyslexia
- Applying for funding through the Disabled Students' Allowance (DSA)
- Arranging DSA assessments of need
- Special arrangements in examinations
- Accessing loaned equipment (e.g. digital recorders)
- Specialist one-to-one "study skills" tuition
- Ensuring access to course materials in alternative formats (e.g. Braille)
- Providing educational support workers (e.g. note-takers, readers, library assistants)
- Mentoring support for students with mental health issues and conditions on the autistic spectrum.

Links With Employers, Placement Opportunities and Transferable Skills

There are no formal employer links for this programme. However, the programme will offer an opportunity for graduates to further their career prospects within their own professional specialty, through the acquisition of:

1. A broad knowledge of stem cell and developmental biology.
2. An understanding of the research and clinical applications of stem cells in regenerative medicine, including aspects of tissue and genome engineering.
3. Skills for designing, evaluating and conducting experiments within their area of interest in stem cell biology and regenerative medicine.
4. Development of transferable skills, including:
 - communicating effectively to diverse audiences via oral presentations and written reports
 - working collaboratively within a team
 - conducting work in a professional manner, mindful of intellectual and ethical integrity

Programme Specification Approval

Person completing Programme Specification

Drs. Kristin Braun and John Connelly

Person responsible for management of programme

Date Programme Specification produced/amended by School Learning and Teaching Committee

15 Dec 2016

Date Programme Specification approved by Taught Programmes Board

24 May 2017